

CLAIMS

We claim:

- 1 1. A burst generator, comprising:
2 structure for placing at least a portion of a liquid into a tension state,
3 said tension state being below a cavitation threshold of said liquid, said tension
4 state imparting stored mechanical energy into said liquid portion;
5 structure for cavitating said liquid portion sufficient to bubble nucleate
6 at least one bubble having a bubble radius greater than a critical bubble radius of
7 said liquid, formation of said bubble releasing at least a portion of said energy
8 stored in said tension state.
- 1 2. The burst generator of claim 1, wherein said structure for placing a
2 liquid under tension is a centrifugal source.
- 1 3. The burst generator of claim 1, wherein said structure for placing a
2 liquid under tension is an acoustic wave source.
- 1 4. The burst generator of claim 3, wherein said acoustical wave source
2 includes an acoustical wave focusing device.

1 5. The burst generator of claim 4, wherein said focusing device is a
2 parabolic-type reflector.

1 6. The burst generator of claim 1, wherein said structure for placing said
2 liquid under tension is a magnetostrictive source.

1 7. The burst generator of claim 1, wherein said structure for placing said
2 liquid under tension is an electrostrictive (piezoelectric) source.

1 8. The burst generator of claim 1, wherein said structure for cavitating
2 is an acoustical source.

1 9. The burst generator of claim 1, wherein said structure for placing said
2 liquid under tension is an acoustical source, said acoustical source also being said
3 structure for cavitating.

1 10. The burst generator of claim 1, wherein said structure for cavitating
2 is a source of fundamental particles, said source of fundamental particles being at
3 least one selected from the group consisting of alpha emitters, neutron sources and
4 fission fragment sources.

1 11. The burst generator of claim 1, wherein said structure for cavitating
2 comprises at least one selected from a laser source and a mechanical source.

1 12. The burst generator of claim 1, wherein said structure for cavitating is
2 neutron source, said neutron source being an isotopic source having at least one
3 shutter, said shutter opened to synchronize neutron impact with a location in said
4 liquid when said liquid is at a predetermined liquid tension level.

1 13. The burst generator of claim 1, wherein said structure for cavitating is an
2 alpha particle source.

1 14. The burst generator of claim 1, wherein said liquid is at least one
2 selected from the group consisting of water, mercury, acetone, tetrachloroethylene,
3 acetophenone and glycols.

1 15. The burst generator of claim 1, wherein said liquid is a biological liquid,
2 said biological liquid selected from the group consisting of blood, synovial liquid,
3 mucus and urine.

1 16. The burst generator of claim 1, wherein said energy stored in said
2 tension state is released no more than about 1.0 μ sec following receipt of
3 cavitation initiation energy from said structure for cavitating.

1 17. The burst generator of claim 1, wherein said structure for placing a
2 liquid into a tension state includes structure for controlling a tension level of said
3 tension state.

1 18. The burst generator of claim 1, further comprising a structure for
2 generating an oscillatory pressure field in said liquid, a compressive phase of said
3 pressure field for imploding at least one of said bubbles.

1 19. The burst generator of claim 1, further comprising a structure for
2 condensing said vapor back into a liquid state following formation of said bubbles.

1 20. The burst generator of claim 1, wherein said burst generator further
2 includes a controller for synchronizing delivery of at least one cavitation signal from
3 said structure for cavitating at a predetermined location in said liquid having a
4 predetermined tension level.

1 21. The burst generator of claim 20, wherein said structure for placing a
2 liquid into a tension state produces a time varying tension level in said liquid.

1 22. The burst generator of claim 1, further comprising a cooling device for
2 reducing a temperature of said liquid below ambient temperature.

1 23. A burst generator, comprising:
2 a container for confining a liquid;
3 structure for placing at least a portion of said liquid into a deep
4 metastable state, and
5 structure for cavitating at least a portion of said liquid sufficient to
6 bubble nucleate at least one bubble having a bubble radius greater than a critical
7 bubble radius of said liquid.

1 24. The burst generator of claim 23, wherein said structure for placing at
2 least a portion of said liquid into a deep metastable state is an acoustical source
3 and said structure for cavitating is a neutron source.

1 25. An armament, comprising:
2 a substantially enclosed container having at least one projectile and a
3 liquid;
4 structure for placing said liquid into a tension state, said tension state
5 being below the cavitation threshold of said liquid, said tension state imparting
6 stored mechanical energy into said liquid, and
7 structure for cavitating at least a portion of said tensioned sufficient to
8 bubble nucleate at least one bubble having a bubble radius greater than a critical
9 bubble radius of said liquid, formation of said bubble releasing at least a portion of

10 said energy stored in said tension state, whereby an explosive burst results which
11 propels said projectile out of said container.

1 26. The armament of claim 25, wherein said projectile includes an
2 explosive.

1 27. The armament of claim 25, wherein said armament is a gun or a rifle.

1 28. The armament of claim 25, further comprising a structure for
2 controlling thrust, wherein said armament develops a controllable thrust within said
3 container, whereby different remote distances can be reached by said projectile
4 without adjusting a firing angle of said armament.

1 29. The armament of claim 28, wherein said structure for controlling
2 thrust controls a level of said tension state.

1 30. The armament of claim 28, wherein said structure for controlling
2 thrust controls energy released by said structure for cavitating.

1 31. The armament of claim 25, wherein said structure for cavitating
2 is a source of fundamental particles.

1 32. The armament of claim 25, wherein said structure for cavitating
2 is a neutron source.

1 33. The armament of claim 25, wherein said liquid is at least one selected
2 from the group consisting of water, mercury, acetone, tetrachloroethylene,
3 acetophenone and glycols.

1 34. The armament of claim 25, further comprising a structure for
2 condensing said vapor back into a liquid state following bubble formation.

1 35. The burst generator of claim 25, wherein said armament further
2 includes a controller for synchronizing delivery of at least one initiation signal from
3 said structure for cavitating with a desired tension level in said liquid.

1 36. The armament of claim 25, wherein said structure for placing a liquid
2 into a tension state produces a time varying tension level in said liquid.

1 37. The armament of claim 25, further comprising a cooling device for
2 reducing a temperature of said liquid below ambient temperature.

1 38. A medical device, comprising:

2 structure for placing a bodily liquid region contained within a body into
3 a tension state, said tension state being below the cavitation threshold of said
4 bodily liquid and imparting stored mechanical energy into said liquid in said region;
5 structure for initiating cavitation of at least a portion of liquid in said
6 region into at least one bubble while said liquid in said region is in said tension
7 state; and
8 structure for applying a compressive wave to at least one of said
9 bubbles.

10 39. The medical device of claim 38, wherein structure for placing a liquid
11 region contained within a body into a tension state and said structure for applying a
12 compressive wave to at least one of said bubbles are supplied by a single source of
13 an oscillatory pressure field.

14 40. The medical device of claim 38, wherein said structure for placing a
15 liquid into an oscillatory pressure state is an acoustic wave source.

16 41. The medical device of claim 40, wherein said acoustical wave source
17 includes an acoustical wave focusing device.

1 42. The medical device of claim 41, wherein said device further comprises
2 a parabolic-type reflector.

1 43. The medical device of claim 38, wherein said structure for structure
2 for initiating cavitation comprises an acoustical source.

1 44. The medical device of claim 38, wherein said structure for initiating
2 cavitation is a source of fundamental particles, said source of fundamental particles
3 being at least one selected from the group consisting of alpha emitters, neutron
4 sources and fission fragment sources.

1 45. The medical device of claim 38, wherein said neutron source is an
2 isotopic source with at least one shutter, wherein said neutron source is an
3 isotopic source having at least one shutter, said shutter opened to synchronize
4 neutron impact with a location in said bodily liquid having a predetermined liquid
5 tension level.

1 46. The medical device of claim 45, wherein said predetermined liquid
2 tension level is approximately a maximum tension level provided by said liquid.

1 47. The medical device of claim 38, wherein said bodily liquid is at least
2 one selected from the group consisting of blood, synovial liquid, mucus and urine.

1 48. The medical device of claim 38, wherein said structure for placing a
2 bodily liquid into a tension state includes structure for controlling a level of said
3 tension state.

1 49. The medical device of claim 38, wherein said structure for placing a
2 bodily liquid region contained within a body into an oscillating pressure state
3 comprises a plurality of oscillatory pressure sources.

1 50. The medical device of claim 38, wherein said structure for initiating
2 cavitation comprises at least one selected from a laser source and a mechanical
3 source.

1 51. A pulse generator, comprising:
2 a container for containing a liquid;
3 structure for placing a liquid into a tension state, said tension state
4 being below the cavitation threshold of said liquid, said tension state imparting
5 stored mechanical energy into said liquid;
6 structure for cavitating at least a portion of said tensioned liquid
7 sufficient to bubble nucleate at least one bubble having a bubble radius greater than
8 a critical bubble radius of said liquid, formation of said bubble releasing at least a
9 portion of said energy stored in said tension state.

1 52. The pulse generator of claim 51, wherein said structure for placing a
2 liquid under tension is an acoustic wave source.

1 53. The pulse generator of claim 51, wherein said structure for placing
2 said liquid under tension is an acoustical source, said acoustical source also being
3 said structure for cavitating.

1 54. The pulse generator of claim 51, wherein said structure for cavitating
2 is a source of fundamental particles, said source of fundamental particles being at
3 least one selected from the group consisting of alpha emitters, neutron sources and
4 fission fragment sources.

1 55. The pulse generator of claim 51, wherein said structure for cavitating
2 comprises at least one selected from a laser source and a mechanical source.

1 56. The pulse generator of claim 51, wherein said structure for cavitating
2 is a neutron source, said neutron source being an isotopic source with at least one
3 shutter, said shutter adapted to open to synchronize neutron impact with a location
4 in said liquid having a predetermined liquid tension level.

1 57. The pulse generator of claim 51, wherein said liquid is at least one
2 selected from the group consisting of water, mercury, acetone, tetrachloroethylene,
3 acetophenone and glycols.

1 58. The pulse generator of claim 51, wherein said structure for placing a
2 liquid into a tension state includes structure for controlling a level of said tension
3 state.

1 59. The pulse generator of claim 51, further comprising a structure for
2 converting said bursts into electromagnetic signals.

1 60. The pulse generator of claim 51, wherein said bursts are directed to
2 propel a liquid through an orifice, said orifice being no larger than micron scale.

1 61. A method for producing energetic bursts, comprising the steps of:
2 placing a liquid into a tension state, said tension state being below the
3 cavitation threshold of said liquid, said tension state imparting stored mechanical
4 energy into said liquid;

5 cavitating at least a portion of said tensioned liquid sufficient to bubble
6 nucleate at least one bubble having a bubble radius greater than a critical bubble
7 radius of said liquid, formation of said bubble releasing at least a portion of said
8 energy stored in said tension state.

1 62. The method of claim 61, wherein a centrifugal source is used for said
2 tensioning.

1 63. The method of claim 61, wherein an acoustic wave source is used for
2 said tensioning.

1 64. The method of claim 63, further comprising the step of focusing said
2 acoustical waves.

1 65. The method of claim 64, wherein a parabolic-type reflector is used for
2 said focusing.

1 66. The method of claim 61, wherein a source of fundamental particles is
2 used for said cavitating step.

1 67. The method of claim 61, wherein a neutron source is used for said
2 cavitating step, said neutron source for emitting high energy neutrons.

1 68. The method of claim 67, further comprising the step of synchronizing
2 neutron impact with a location having a predetermined liquid tension level.

1 69. The method of claim 61, wherein said liquid is at least one selected
2 from the group consisting of water, mercury, acetone, tetrachloroethylene,
3 acetophenone and glycols.

1 70. The method of claim 61, further comprising the step of imploding said
2 bubbles.

1 71. The method of claim 70, wherein an externally applied pressure field is
2 used to generate a compressive pressure field in said liquid for said imploding step.

1 72. The method of claim 61, further comprising the step of condensing
2 said vapor back into said liquid.

1 73. The method of claim 61, further comprising the step of synchronizing
2 delivery of at least one initiation signal with a desired tension level in said liquid.

1 74. The method of claim 61, further comprising the step of cooling said
2 liquid below ambient temperature.

1 75. The method of claim 61, wherein a laser source or a mechanical
2 source is used for said cavitating step.